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ORIGINAL PAPER

# Self-Rated Health Among Saudi Adults: Findings from a National Survey, 2013

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**Abstract** Self-rated health reflects a person's integrated perception of health, including its biological, psychological, and social dimensions. It is a predictor of morbidity and mortality. To assess the current status of self-rated health and associated factors in the Kingdom of Saudi Arabia, we analyzed data from the Saudi Health Interview Survey. We conducted a large national survey of adults aged 15 years or older. A total of 10,735 participants completed a standardized health questionnaire. Respondents rated their health with a five-point scale. Data on socio-demographic characteristics, chronic diseases, health-related habits and behaviors, and anthropometric measurements were collected. Associated factors of self-rated health were analyzed using a backward elimination multivariate logistic regression model. More than 77 % of respondents rated their health as excellent/very good. Female sex [odds ratio (OR) 1.52, 95 % confidence interval (CI) 1.24–1.88], decades of age (OR 1.35, 95 % CI 1.25–1.46), diagnosed diabetes mellitus (OR 1.54, 95 % CI 1.22–1.93), diagnosed hypercholesterolemia (OR 1.37, 95 % CI 1.06–1.79), diagnosed hypertension (OR 1.55, 95 % CI 1.22–1.96), number of other diagnosed chronic diseases (OR 1.69, 95 % CI 1.41–2.03), limited vigorous activity (OR 3.59, 95 % CI 2.84–4.53), need for special equipment (OR 2.62, 95 % CI 1.96–3.51), and more than 3 h of daily television/computer screen time (OR 1.59, 95 % CI1.11–2.29) were positively associated with poor/fair health. Smoking, obesity, and physical inactivity were not associated with self-reported health. We found that preventable risk factors are not associated with Saudis' self-rated health. This optimistic perception of health poses a challenge for preventive interventions in the Kingdom and calls for campaigns to educate the public about the harm of unhealthy behaviors.

**Keywords** Health status · Self-rated health · Subjective health · Perceived health · Saudi Arabia

## Introduction

Populations' health are measured by mortality and morbidity indicators as well as combined measures such as disability-adjusted life years (DALYs). [1, 2] Another measure is the use of health services, as it quantifies how a population responds to its health conditions. There is a growing public health and medical interest in assessing health status subjectively from individuals' point of view. [2] Some researchers suggest that self-rated health status might be a suitable proxy for more objective measures of health in epidemiological studies. [3] Other studies concludes that ignoring self-rated health status will bias findings due to the complex interactions between physical, emotional, and social conditions in etiology of disease [2]. In fact, self-rated health status is often used by health professionals in the process of care for monitoring and improving health [4].

Self-rated health reflects a person's integrated perception of health, including its biological, psychological, and social dimensions that are not necessarily accessible to external observers. Subjective health, perceived health, and self-rated

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health are usually used interchangeably in health literature. Self-rated health is measured by different tools. Many researchers prefer using a simple single item question for rating health on an ordinal scale, while others prefer validated questionnaires on quality of life, health-related quality of life, or functional status. [5, 6] Sometimes researchers use more specified tools, such as the Nottingham Health Profile for measuring subjective health. [2]

Several studies have documented strong and robust association between levels of subjective health with morbidity and mortality, even after adjusting numerous relevant covariates. Also, self-rated health is associated with health service use, such as number of outpatient visits. [7, 8]

Idler and Benyamini in a review article showed that self-rated health is an independent predictor of mortality despite the inclusion of specific health status indicators and other covariates that predict mortality. [8] Kaplan et al. [3] showed strong age-adjusted associations between level of self-rated health and incidence of myocardial infarction, as well as cardiovascular and all-cause mortality.

Although there are several reports on the status of common diseases and risk factors in Saudi Arabia [9], we did not find any report of self-rated health in the Saudi general population. Matthews and Nelsen reported self-rated health in a group of expatriates in Riyadh, which is not representative of the Saudi population [10].

In order to assess self-rated health and its associated factors in Saudi adults, we used data from a large nationally representative survey conducted in 2013.

## Methods

The Saudi Health Interview Survey was a cross-sectional national multistage survey of individuals aged 15 years or older. In the survey, the Kingdom of Saudi Arabia (KSA) was divided into 13 regions, and each region was divided into subregions and blocks. All regions were included, and a probability proportional to size method was used to randomly select subregions and blocks. Households were randomly selected from each block. A roster of household members was conducted, and an adult aged 15 or older was randomly selected from the household to be surveyed. If the randomly selected adult was not present, our surveyors made another appointment to return, up to three times, before considering the household as a nonresponse. Other findings of the survey are available elsewhere [11–13].

The Saudi Ministry of Health and its Institutional Review Board (IRB) approved the study protocol. The University of Washington IRB deemed the study as IRB exempt, since the Institute for Health Metrics and Evaluation received de-identified data for this analysis. All respondents consented and agreed to participate in the study.

The survey included questions on socio-demographic characteristics, self-rated health, and a selected list of chronic conditions and risk factors for health. We measured self-rated health by asking respondents "In general, would you say your health is excellent, very good, good, fair, or poor?" with a per-request explanation about its timeframe (the past 30 days). For analytical purposes, we generated a dichotomous variable with either poor/fair self-rated health vs. excellent/very good/good self-rated health. To assess changes in self-rated health, respondents were asked, "Compared with 12 months ago, would you say your health in general is now better, worse, or about the same?"

Individuals were classified into three groups of never smokers, former smokers, and current smokers through two questions: "Have you ever smoked any tobacco products, such as cigarettes, cigars or pipes, or Shisha?" and "Do you currently smoke any tobacco products, such as cigarettes, cigars, pipes or Shisha?"

We measured weight and height to calculate body mass index (BMI) as kg/m$^2$. Participants were classified into four groups: underweight (BMI $< 18.5$), normal weight ($18.5 \leq$ BMI $< 25$), overweight ($25 \leq$ BMI $< 30$), and obese (BMI $\geq 30$).

We used the International Physical Activity questionnaire to measure the physical activity in occupational and recreational settings. The respondents were classified into four groups: (1) met vigorous physical activity, (2) met moderate physical activity, (3) insufficient physical activity to meet vigorous or moderate levels, and (4) no physical activity [14]. We computed the servings of fruits and vegetables consumed per day from a detailed dietary questionnaire as the sum of the average daily servings.

We asked, "In a typical week, how much time do you usually spend in front of the television or on the computer?" Then we classified individual into three groups: less than an hour, one to 3 h, or more than 3 h per day.

Respondents were also asked to rate their ability to perform activities. They were asked for their ability to perform vigorous activities ("Does your health now limit you in doing vigorous activities, such as running, lifting heavy objects, or participating in strenuous sports?"), mild activities ("During the past 30 days, how difficult was it to perform any of the following activities: walking a short distance, standing from a seated position, standing for a short period of time, climbing one step of stairs?"), their usual work or house activities ("During the past 30 days, how difficult was it to perform your work or house activities?"), and specific functional abilities ("Are you able to climb up five steps?"). We also asked whether the respondent require to use special equipment such as cane, a wheelchair, a special bed, or a special telephone or not.

To assess diagnosed hypertension, diabetes mellitus, and hypercholesterolemia, respondents were asked separate questions about whether they have been told by a doctor,

nurse, or other health professional that they have those conditions or not. Similarly, the same type of questions were used to determine previous diagnosis of stroke, myocardial infarction, atrial fibrillation, cardiac arrest, congestive heart failure, chronic obstructive pulmonary disease, asthma, renal failure, and cancer.

We used a backward elimination multivariate logistic regression model to measure association between the outcome variables of poor/fair self-rated health and different factors, including sex, age, marital status, education, smoking, television/computer daily screen time, dietary fruit and vegetable intake, occupational and recreational physical activity, limited vigorous activity, need for special equipment, sum of diagnosed chronic conditions, diagnosed diabetes mellitus, diagnosed hypercholesterolemia, and diagnosed hypertension.

Of the 10,735 completed interviews, all had age and sex data, but we excluded 31 observations due to missing self-rated health, 310 due to missing limited rigorous activity, 32 due to missing self-reported chronic conditions, 115 due to missing diagnosed diabetes status, 266 due to missing diagnosed hypercholesterolemia status, 22 due to missing diagnosed hypertension, 29 due to missing smoking status, 398 due to missing obesity values, 213 due to missing the time of physical activity, 67 due to missing need for special equipment, 212 due to missing fruit and vegetable consumption, 33 due to missing marital status, and 20 due to missing educational level. In total, 9167 observations were used in the regression analyses.

Data were weighted to account for the probability of selection and age and sex post stratification based on census data for age and sex distribution of the Saudi population. We used Stata 13.1 for windows (StataCorp LP, TX, USA) for the analyses and to account for the complex sampling design.

## Results

A total of 12,000 households were originally contacted, and 10,735 participants completed the Saudi Health Interview Survey questionnaire between April and June 2013 (response rate: 89.4 %). Characteristics of respondents who completed the questionnaire are presented in Table 1.

Around half (49.6 %) of Saudi people rated their health as excellent, 27.5 % as very good, 17.0 % as good, 4.6 % as fair, and 1.3 % as poor. Around 13.5 % said that their health is now worse than 12 months ago, while 61.0 % rated their health as the same and 25.4 % as better.

Figure 1 shows the distribution of self-rated health states in different regions of Saudi Arabia. The highest proportion of "excellent or very good" (excellent/very good) and the lowest proportion of "fair or poor" (poor/-fair) were seen in Al Jawf, while the highest proportion of poor/fair and lowest proportion of excellent/very good were seen in Al Bahah and Tabuk respectively.

Self-rated health was associated with socio-demographic variables (Table 2). Self-rated poor/fair health was more common in older people. Among individuals who did not report any chronic conditions, 4.9 % reported poor/fair health, while poor/fair health was reported by 16.7 and 44.6 % of those who reported one and two or more chronic conditions, respectively (Table 3).

In multivariate analyses, older age, female sex, diagnosed diabetes mellitus, diagnosed hypercholesterolemia, diagnosed hypertension, number of diagnosed other chronic diseases, limited vigorous activity, need for special equipment, and more than 3 h of daily TV/computer screen time were associated with poor/fair self-rated health (Table 3).

**Table 1** Socio-demographic characteristics of the study participants; KSA, 2013

| Socio-demographic characteristics | Categories | Total | Weighted (%) | SE |
|---|---|---|---|---|
| Sex | Male | 5253 | 50.6 | 0.7 |
| | Female | 5482 | 49.4 | 0.7 |
| Age | 15–24 years old | 2382 | 40.3 | 0.7 |
| | 25–34 years old | 2757 | 21.5 | 0.5 |
| | 35–44 years old | 2339 | 15.2 | 0.4 |
| | 45–54 years old | 1520 | 12.4 | 0.4 |
| | 55–64 years old | 862 | 6.5 | 0.3 |
| | 65 years or older | 875 | 4.2 | 0.2 |
| Marital status | Never married | 2829 | 45.7 | 0.7 |
| | Currently married | 6976 | 49.2 | 0.7 |
| | Separated, divorced, or widowed | 929 | 5.1 | 0.2 |
| Education | Primary school or less | 3286 | 26.3 | 0.6 |
| | Elementary or high school | 4780 | 51.9 | 0.7 |
| | College or higher education | 2649 | 21.8 | 0.5 |

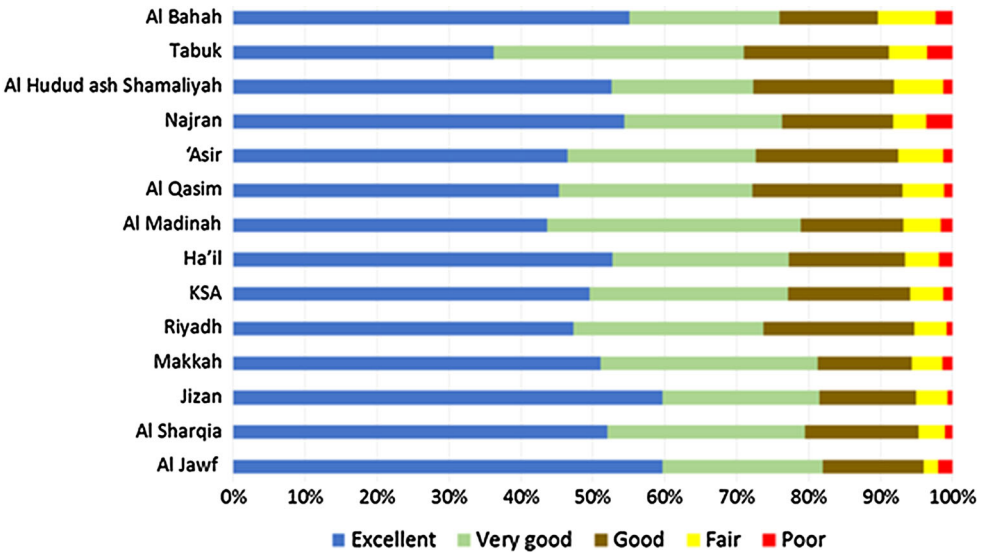


**Fig. 1** Frequency of different states of self-rated health in the regions of Saudi Arabia

**Table 2** Self-rated health by age groups in the KSA, 2013

| | Subgroup | Excellent | | | Very good | | | Good | | | Fair | | | Poor | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | % | SE | N | % | SE | N | % | SE | N | % | SE | N | % | SE |
| Age group (years) | 15–24 | 1572 | 65.3 | 1.3 | 513 | 22.4 | 1.1 | 230 | 9.4 | 0.8 | 42 | 2.3 | 0.4 | 20 | 0.60 | 0.19 |
| | 25–34 | 1537 | 55.6 | 1.3 | 793 | 29.9 | 1.2 | 345 | 12.3 | 0.8 | 55 | 1.4 | 0.2 | 21 | 0.76 | 0.21 |
| | 35–44 | 1044 | 41.2 | 1.3 | 751 | 33.9 | 1.3 | 444 | 20.6 | 1.1 | 67 | 3.4 | 0.6 | 26 | 0.95 | 0.27 |
| | 45–54 | 442 | 27.8 | 1.5 | 500 | 33.1 | 1.6 | 422 | 29.5 | 1.5 | 115 | 7.4 | 0.9 | 34 | 2.16 | 0.54 |
| | 55–64 | 152 | 17.6 | 1.8 | 258 | 32.2 | 2.2 | 272 | 33.5 | 2.2 | 139 | 14.0 | 1.5 | 37 | 2.70 | 0.60 |
| | 65+ | 93 | 11.6 | 1.5 | 165 | 18.1 | 1.8 | 306 | 37.6 | 2.3 | 240 | 25.3 | 2.0 | 69 | 7.34 | 1.17 |

Being previously or currently married, having higher education, and consuming more servings of fruits/vegetables were associated with better self-rated health. Obesity, smoking, and physical activity were not significantly associated with self-reported poor/fair health.

Around 49 % of individuals who reported not being able to climb five steps rated their health as poor/fair, compared to 3.3 % among those who did not report difficulty climbing steps. Around 43 % of individuals who were unable to perform their usual work or house activities rated their health as poor/fair, compared to 2.5 % among those who did not. Moreover, 51.8 % of the individuals who reported that they were unable to perform mild physical activities rated their health poor/fair, compared to 2.6 % among those who did not.

## Discussion

Our study is the first reporting self-rated health among Saudi adults. We found that Saudis in general report that their health is excellent or very good. We found that poor health is associated with diagnosed chronic conditions and disabilities. Saudis have a favorable view of their health, until they are diagnosed with chronic conditions and need treatment or special equipment to manage these conditions. Our study is of great importance, as it reveals that Saudis do not perceive that risk factors can harm their health and quality of life.

The lack of association between self-rated health and other important risk factors such as smoking, obesity, or low physical activity is puzzling. This may be the reason why Saudis do not take appropriate action to improve their health behaviors. Indeed, previous studies showed that such a perception of risk is required to initiate health behavior changes. [15, 16] These results pose a major challenge for health authorities in the Kingdom and call for campaigns to educate the public about the harm of risky health behaviors.

Previous studies showed that Arabs do not perceive their health as priority over economy and politics. [17] Unless there is a debate about health and the benefits of a healthy lifestyle, Saudis may not see the benefits of behavioral changes. Such a debate is crucial. The Saudi Ministry of Health should focus on health education, and programs to

**Table 3** Association of selected demographic, social, behavioral, and health factors with self-rated health in the *KSA*, 2013

| Factors | Categories | Poor/fair health | | | Adjusted OR | 95 % CI | |
|---|---|---|---|---|---|---|---|
| | | N[a] | Percent | SE | | | |
| Decades of age | | NA | NA | NA | 1.35 | 1.25 | 1.46 |
| Sex | Male (Ref) | 359 | 5.1 | 0.4 | 1.00 | | |
| | Female | 463 | 6.5 | 0.5 | 1.52 | 1.24 | 1.88 |
| Marital status | Never married (Ref) | 100 | 3.1 | 0.4 | 1.00 | | |
| | Currently married | 524 | 7.2 | 0.4 | 0.58 | 0.43 | 0.78 |
| | Separated, divorced, or widowed | 198 | 17.0 | 1.7 | 0.61 | 0.41 | 0.90 |
| Education | Primary education or less (Ref) | 551 | 12.6 | 0.8 | 1.00 | | |
| | Elementary or high school completed | 184 | 3.3 | 0.3 | 0.72 | 0.57 | 0.92 |
| | College degree or higher education | 87 | 3.5 | 0.6 | 0.70 | 0.52 | 0.93 |
| Number of chronic conditions diagnosed | | NA | NA | NA | 1.69 | 1.41 | 2.03 |
| Diagnosed diabetes mellitus | No | 497 | 4.4 | 0.3 | 1.00 | | |
| | Yes | 305 | 19.9 | 1.5 | 1.54 | 1.22 | 1.93 |
| Diagnosed hypercholesterolemia | No | 591 | 4.9 | 0.3 | 1.00 | | |
| | Yes | 169 | 17.8 | 1.8 | 1.37 | 1.06 | 1.79 |
| Diagnosed hypertension | No | 529 | 4.4 | 0.3 | 1.00 | | |
| | Yes | 274 | 22.7 | 1.8 | 1.55 | 1.22 | 1.96 |
| Self-reported limited vigorous activities | No | 128 | 2.1 | 0.3 | 1.00 | | |
| | Yes | 675 | 12.6 | 0.7 | 3.59 | 2.84 | 4.53 |
| Need for special equipment | No | 628 | 5.0 | 0.3 | 1.00 | | |
| | Yes | 194 | 40.6 | 3.5 | 2.62 | 1.96 | 3.51 |
| Physical activity | No activity (Ref) | 558 | 8.9 | 0.6 | 1.00 | | |
| | Insufficient | 125 | 4.2 | 0.5 | 0.82 | 0.65 | 1.04 |
| | Moderate | 48 | 3.6 | 0.8 | NA | | |
| | Vigorous | 91 | 3.1 | 0.5 | 1.18 | 0.91 | 1.54 |
| Smoking | Never smokers (Ref) | 690 | 5.7 | 0.3 | 1.00 | | |
| | Former smokers | 58 | 10.9 | 1.8 | 1.23 | 0.83 | 1.82 |
| | Current smokers | 74 | 5.0 | 0.8 | NA | | |
| Daily servings of fruits and vegetables | 0 servings per day (Ref) | 372 | 7.9 | 0.6 | 1.00 | | |
| | 1–4 serving(s) per day | 402 | 4.7 | 0.3 | 0.56 | 0.46 | 0.67 |
| | 5 servings or more | 48 | 4.9 | 1.1 | 0.50 | 0.34 | 0.74 |
| Obesity class | 18.5–24.9 kg/m2 (Ref) | 195 | 4.2 | 0.4 | 1.00 | | |
| | <18.5 kg/m2 | 29 | 6.6 | 1.6 | 1.43 | 0.88 | 2.32 |
| | 25–29.9 kg/m2 | 248 | 5.1 | 0.4 | 0.88 | 0.69 | 1.12 |
| | 30 kg/m2 or more | 350 | 8.0 | 0.6 | 0.86 | 0.68 | 1.10 |
| TV and computer screen time | Less than 1 h per day (Ref) | 591 | 5.9 | 0.3 | 1.00 | | |
| | 1–3 h per day | 100 | 4.4 | 0.7 | 1.21 | 0.94 | 1.56 |
| | More than 3 h per day | 47 | 4.3 | 1.1 | 1.59 | 1.11 | 2.29 |

[a] Among the data that are used in the logistic regression analysis

reach and initiate change in the Saudi population are urgently needed. Moreover, such programs should include community and personal interventions, in addition to national and regional programs [18].

Our finding of the association of self-rated poor health with chronic conditions is consistent with most other studies. Miilunpalo showed that chronic diseases have a distinct association with poor self-rated health [7, 19, 20]. When these conditions are diagnosed and individuals are under treatment, they report poor health [21]. Moreover, increasing age usually leads to increasing illness, disability, and poor self-perception of health [20, 22, 23].

In some studies, gender did not correlate with subjective health, while others showed that it is worse among females [19,

22, 24]. Poor subjective health in women might be a reflection of real health problems, different types of chronic conditions that affect men and women, greater tendency of women to report health problems, or an employment effect. [5, 22].

Other studies have reported a significant association between self-rated health and smoking [25, 26]. We did not see such an association in our study, perhaps due to the interaction between gender and smoking.

Television watching was not associated with poor self-rated health in another study. [26] In our study, we found a positive association between high television and computer screen time and poor self-perception of health.

Self-rated health might not be completely appropriate for cross-country comparisons, because of the influence of cultural and religious factors, health literacy, social norms, and expectations of the ideal health. In the United States, 18 % of adult individuals rated their health as poor/fair in 2012, compared to 6 % in our sample. Moreover, 51 % of Americans reported their health as excellent/very good, compared to 77 % of Saudis. [27] Jürges reported that self-rated poor/fair health ranged from 12 to 41 % in 10 European countries in individuals 50 years or older. We found few reports on self-rated health from the Eastern Mediterranean countries. Most studies were limited to specific age groups or geographic areas [6, 10, 20, 28–30]. Ratings of excellent/very good self-rated health ranged from 53 % in rural Turkey to 70 % in Tehran, Iran [20, 28, 30].

Our study has some limitations. First, our data are cross-sectional and we cannot assess causality. Second, many of our behavioral data, such as smoking, physical activity, and diet, are self-reported and subject to recall and social desirability biases. Finally, we did not collect data on mental health, social capital, or social support, which are usually recognized as factors that influence self-rated health. Despite these limitations, our study was based on a large sample size and used a standardized methodology for all its measures.

Our study found that Saudis have a high perception of their health, even with a high prevalence of risk factors. This may be due to the culture and religion of the country or Saudis' beliefs being reinforced by similar views of family members and friends. However, the high prevalence of risk factors in the Saudi population should call for programs to educate the public about the harmful nature of these risk factors and their future impact on health. It is time to reinforce the importance of a healthy lifestyle in Saudis to reduce the burden of disease, irrespective of self-perception of health.

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**Conflict of interest** The authors state that they have no conflict of interests for the original study and current paper.

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